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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Natale Speciale

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INTELLECTUAL PROPERTY GROUP

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EXAMINER

DHINGRA, RAKESH KUMAR

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,937	Applicant(s) SPECIALE ET AL.	
	Examiner RAKESH K. DHINGRA	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 October 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

Fig. 7 – Reference number 11 is not shown in the drawing as disclosed on page 11, line 5 of the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

In specification - Page 6, line 20 and page 9, line 26 of the specification disclose “passages 21“, which may be corrected to “passages 12”, since reference number 21 pertains to “wafer cavities” as per page 5, line 9 of the specification.

Appropriate correction/reconciliation is required.

Response to Arguments

Response to applicant's arguments regarding claim rejections is given hereunder.

§102(b) and §103(a) Rejections and Applicant's Response

1) Applicant argues that the principle on which Kai is based is opposite of that considered with Applicant's embodied invention, since one of skill in the art upon reviewing Kai, would appreciate the gas flows are not used to lift and rotate the susceptor, and that notches 25 in Kai are shaped to serve as conduits in routing the gas flows into and out of the wafer pocket of the susceptor, as against the claimed depressed areas on the bottom side of the support element that are shaped to receive the thrust of gas flows. Thus, Kai fails to anticipate the features of claim 22, and the corresponding 102(b) rejection should be withdrawn. Further, locating the depressed areas on the bottom side of the support element 20 combined with the depressed areas being shaped to receive the thrust of the gas flows enables the rotational movement of the support element to be gradually accelerated, thereby eliminating the substrates or wafers carried on top of the element from being disturbed (e.g., paragraph [0067] of Applicant's published application) which is further found to be deficient from the teaching of Kai. Applicant further contends that with reference to paragraphs [0055], [0088], [0090], [0095] and with reference to Fig. 6 of Applicant's published application, it is further taught how an edge of the depressed areas is positioned and/or shaped so that gas flows exert a thrust thereon. Claims 29-31 are specifically focused on this relationship between edge and depressed areas. However, these claims are further rejected under 102(b) as being anticipated by Kai. In light of the Applicant's description (i.e., the above-referenced paragraphs, as well as others), reconsideration of rejection is requested.

Art Unit: 1792

Examiner responds that claim 22 recites “---the bottom side is provided with depressed areas shapes to receive the thrust of gas flows”. Kai teaches a disc shaped support element 4 (susceptor) having a flat upper side provided with at least one cavity 13 for a substrate or wafer and with a substantially flat bottom side, wherein the bottom side is provided with gas inlet notches 25 that have depressed areas (at the location where gas flow enters the susceptor – Fig. 7) which would receive thrust of the incoming gas flow, when the gas flows towards the center of susceptor from the outer periphery) {e.g. Figs. 1, 2, 8-12 and para. 0050, 0051, 0088}. Applicant remaining arguments, in particular, those referring to applicant’s specification are not commensurate with claim 22 limitations. Thus Kai teaches all limitations of the claim 22 and the rejection of claims 22-32 is maintained.

2) Further, applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection as explained hereunder.

Applicant has amended claim 1 by adding limitation “support system” in place of “support element” in line 7.

Reference by Hillier et al (US 5,221,356) when combined with Kai and Bhat et al reads on amended claim 1. Accordingly claims 1-21 have been rejected under 35 USC 103 (a) as explained below. Further, balance claims 3 and 5-11 have also been rejected under 35 USC 103 (a) as explained below.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1792

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 22-27 and 29-32 are rejected under 35 U.S.C. 102(a) as being anticipated by Kai (JP 2004-063779) {equivalent US 2004/0144323 and used hereinafter}.

Regarding Claims 22, 32: Kai teaches an apparatus for epitaxial wafer production and comprising:

A support element 4 (susceptor) having a substantially disc-shaped form with a substantially flat upper side provided with at least one cavity 13 for a substrate or wafer and with a substantially flat bottom side, wherein the bottom side is provided with gas inlet notches 25 that have depressed areas (at the location where gas flow enters the susceptor – Fig. 7) which would receive thrust of the incoming gas flow, when the gas flows towards the center of susceptor from the outer periphery) {e.g. Figs. 1, 2, 8-12 and para. 0050, 0051, 0088}.

Regarding Claims 23, 25: Kai teaches the depressed areas 27 are bound by three sides and have at least one curved side (Fig. 9).

Regarding Claim 24: Kai teaches the gas passages 27 have at least one straight side (Figs. 8-12).

Regarding Claims 26, 27, 29, 30: Kai teaches the depressed areas 27 have a variable depth and the depth increases in the radial direction with respect to its axis (near tapered surface 31). Kai also teach that the depressed area 27 reaches the edge of bottom face of the susceptor 4 and one side of the depressed area 27 coincides with a section of the edge of its bottom side [Fig. 12A].

Art Unit: 1792

Regarding Claim 31: Kai teach that the edges of depressed area 27 positioned and shaped to receive the thrust of gas flows (para. 0089-0097).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 28 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Kai (JP 2004-063779) {equivalent US 2004/0144323 and used hereinafter}.

Regarding Claim 28: Kai teaches all limitations of the claim except the depth of depressed areas diminishes or increases in the tangential direction with respect to axis of support element. Kai however teaches that the shape, number and configuration of depressed area is optimized as per process limitations like rate of gas flow. It would be obvious to optimize the

Art Unit: 1792

depth of depressed area in a tangential direction with respect to axis as per teaching of Kai as per process limitations like rate of gas flows

In this regard courts have ruled:

It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 1-21 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Kai (JP 2004-063779) {equivalent US 2004/0144323 and used hereinafter} as applied to claims 22-27, 29-32, in view of Bhat (US 5,226,383) and Hillier et al (US 5,221,356).

Regarding Claims 1, 8, 18, 20, 21: Kai teaches all limitations of the claim including a rotating support element 4 (susceptor) having a substantially flat upper side provided with at least one cavity 13 for epitaxial production of a wafer and a substantially flat bottom side, and with plurality of symmetrically arranged identical depressed areas (gas passages) 27 on its bottom side that are inclined and preferably skew with respect to its axis.

Kai does not teach the apparatus includes a fixed base element having a substantially flat surface in which a substantially cylindrical seat with a substantially flat bottom is formed, and

the support element being housed inside the seat and being able to rotate about the axis of the seat; wherein the support system comprises one or more passages for one or more of the gas flows, in which said passages emerge inside the seat in directions which are inclined and preferably skew with respect to said axis, in such a way as to lift and rotate the support element.

Bhat teaches a wafer processing apparatus comprising: a fixed base element 10 having a substantially flat surface in which a substantially cylindrical seat 14 with a substantially flat bottom is formed and having gas passages 24, 26 for one or more gas flows. Bhat further teach a

Art Unit: 1792

disc shaped movable support element 12 with gas passages 38, 40, 42 (depressed areas) in its bottom surface, and being housed inside the seat 14 and being able to rotate about the seat axis. Bhat also teach that gas passages 38, 40, 42 emerge inside the seat 14 in directions which are inclined and preferably skew with respect to seat axis, in such a way as to lift and rotate the support element. Bhat additionally teach that shape and extent of gas passages 38, 40, 42 can be optimized to obtain desired gas flow pattern for lift and rotation of the susceptor (e.g. Figs. 1-5 and col. 2, line 30 to col. 4, line 55).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide a fixed base with a seat and the support element housed inside the seat as taught by Bhat in the apparatus of Kai to obtain rotation of the support element for uniform gas flow for wafer processing.

Kai in view of Bhat et al do not teach the gas passages emerge inside the seat in directions which are inclined and skew with respect to seat axis.

Hillier et al teach a substrate processing apparatus comprising a base 12 with an annular seat like portion 36 that has a plurality of inclined gas passages 38 which enable the flowing gas impinge upon depressed areas 34 and rotate a support element 14 (e.g. Figs. 1, 2 and col. 3, line 5 o col. 4, line 40).

Therefore it would have been obvious to one of ordinary skills in the art at the time of the invention to provide the base with gas passages that are inclined to the seat axis as taught by Hillier et al in the apparatus of Kai in view of Bhat et al to enable impinge upon the depressed areas of support element and rotate the same.

Art Unit: 1792

Regarding Claim 2: Bhat teaches that when assembled the upper surface of support element 12 is flush with the top surface of the base 10 (col. 3, lines 5-22).

Regarding Claim 3: Bhat teach an annular channel 26 for discharge of gas (through pipes 32) [col. 2, lines 47-67].

Regarding Claim 4: Bhat teaches the passages 38 branch off from a common gas pipe 80 (Fig. 3).

Regarding Claim 5: Kai teaches that number of and configuration of gas passages 27 is optimized as per process limitations, like rate of gas flow. It would be obvious to optimize the depth of depressed area in a tangential direction with respect to axis as per teaching of Kai as per process limitations like rate of gas flows

In this regard courts have ruled:

It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Regarding Claim 6: Kai teaches hole 22 and pins 23 that help to maintain the susceptor arm 15 stationary during rotation of susceptor (para. 0058-0060).

Regarding Claim 7: Bhat teaches the base 10 has a cylindrical protuberance with a cylindrical pin 22 that mates with a hole 36 in the support element. It would be obvious to have the base with a cylindrical hole and the support element having a pin that mate with each other, as per rearrangement of parts, which is not considered patentable (col. 2, line 45 to col. 3, line 20).

In this regard courts have ruled:

Art Unit: 1792

Mere rearrangement of parts which does not modify the operation of a device is prima facie obvious. *In re Japikse*, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950). *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).

Regarding Claims 9, 11: Kai teaches the depressed areas 27 are bound by three sides and have at least one curved side (Fig. 9).

Regarding Claim 10: Kai teaches the gas passages 27 have at least one straight side (Figs. 8-12).

Regarding Claims 12, 13, 15, 16: Kai teaches the depressed areas 27 have a variable depth and the depth increases in the radial direction with respect to its axis (near tapered surface 31). Kai also teach that the depressed area 27 reaches the edge of bottom face of the susceptor 4 and one side of the depressed area 27 coincides with a section of the edge of its bottom side [Fig. 12A].

Regarding Claim 14: Kai teaches all limitations of the claim except the depth of depressed areas diminishes or increases in the tangential direction with respect to axis of support element. Kai however teaches that the shape, number and configuration of depressed area is optimized as per process limitations like rate of gas flow. It would be obvious to optimize the depth of depressed area in a tangential direction with respect to axis as per teaching of Kai as per process limitations like rate of gas flows

In this regard courts have ruled:

It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Art Unit: 1792

Regarding Claim 17: Kai teach that the edges of depressed area 27 positioned and shaped to receive the thrust of gas flows (para. 0089-0097).

Regarding Claim 19: Bhat teaches that apparatus is suitable for loading/unloading of support element 12 into/from base 14 (Fig. 1).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAKESH K. DHINGRA whose telephone number is (571)272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

Art Unit: 1792

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. K. D./
Examiner, Art Unit 1792

/Karla Moore/
Primary Examiner, Art Unit 1792